



ABT2015 Video Processor

Single-Chip Advanced Video Processor

The ABT2015 is Silicon Image's flagship video processing IC. It is ideally suited for video format conversion and enhancement applications in A/V Receivers, Blu-ray® players/recorders and digital displays.

Applications

- ◆ A/V Receivers
- ◆ Blu-ray Players/Recorders
- ◆ DVD Players/Recorders
- ◆ Set-Top-Boxes
- ◆ High resolution Monitors and HDTVs

Key Features

- ◆ 10-Bit SD/HD Precision Deinterlacing
- ◆ 10-Bit Precision Video Scaling for up-conversion to 1080p and down-conversion to 480i
- ◆ 12-Bit Pre-processing and Post-processing blocks
- ◆ SD/HD Noise Reduction and Picture Enhancement
- ◆ PReP™ – Progressive ReProcessing™ for improving progressive signals in sink applications
- ◆ CEA-861D Compliant Timing
- ◆ On Screen Display
- ◆ Deep Color and xvYCC colorimetry
- ◆ Keystone correction

PReP™

- ◆ Industry's first technology to recover the original interlace signal from a poorly deinterlaced source

The ABT2015 features Video Reference Series™ (VRS™) technologies, including Silicon Image's proprietary Precision Deinterlacing™, which provides arbitrary cadence detection as well as five-field motion and edge adaptive processing for an artifact-free viewing experience. The ABT2015 also includes Precision Video Scaling™ that independently scales an image horizontally and vertically as well as perform keystone correction, and includes MPEG and Mosquito noise reduction and picture enhancement to improve even high-definition images. The ABT2015 also includes Progressive Re-Processing™ (PReP™) technology; a unique processing method that recovers the original interlaced signal from a low quality progressive video signal for processing by the Precision Deinterlacing engine.

The ABT2015 supports Deep Color with 10 bit input and 12 bit output, Frame Rate Conversion (FRC), and pass-through for all mandatory 3D over HDMI® formats and is pin-for-pin compatible with the ABT2010.

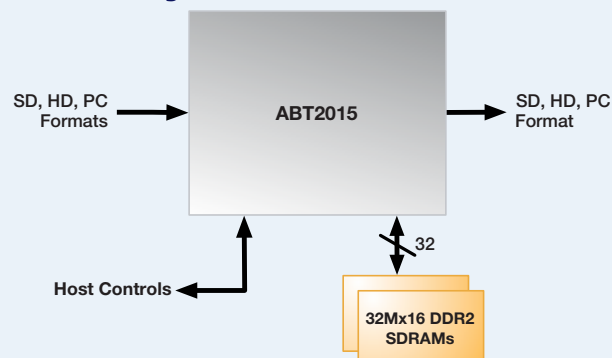
Precision Deinterlacing

- ◆ Award-winning deinterlacer supporting 480i, 576i, 1080i50, and 1080i60 inputs
- ◆ Arbitrary cadence detection (any-to-any) to detect 2:2, 3:3, and non-standard cadences
- ◆ Five-field motion- and edge-adaptive deinterlacing
- ◆ Three-frame video processing with low-latency gaming modes
- ◆ Bad edit detection to minimize artifacts caused by sequence breaks in film content
- ◆ Detection of multiple source types within a frame – for example, video titles over film
- ◆ Detection of transitions between different progressive source types
- ◆ Cadence detection of 480p, 576p, 720p, and 1080p sources for frame rate conversion to 1080p24

Precision Video Scaling

- ◆ Award-winning vertical and horizontal up and down scaling engine supporting a wide range of PC and video formats
- ◆ Panoramic stretch mode to support 4:3 content on a 16:9 display
- ◆ Tearless frame rate conversion
- ◆ Full aspect ratio control
 - Supports multiple input aspect ratios
 - Supports multiple display aspect ratios
 - Zoom, pan, and border functions
 - Keystone correction

ABT2015 System Block Diagram



ABT2015 Video Processor

Single-Chip Advanced Video Processor

MPEG Noise Reduction

- ◆ Mosquito noise reduction for SD/HD formats especially for MPEG2 based content

Picture Enhancement

- ◆ Detail enhancement to increase fine detail or reduce noise for overly enhanced images
- ◆ Edge enhancement to sharpen edges or to reduce overly enhanced edges

Picture Controls

- ◆ Brightness, contrast, saturation, hue, sub-pixel YC delays
- ◆ Output black level controls
- ◆ Dynamic Range Expansion and Compression
- ◆ Input 3x3 matrix to implement color controls such as hue
- ◆ Color Calibration controls using 14-bit 3x3 matrix and pre/post linear interpolators for Gamma control

Input

- ◆ 24/30-bit RGB/YCbCr 4:4:4
- ◆ 16/20/24-bit YCbCr 4:2:2
- ◆ 8/10/12-bit YCbCr 4:2:2 (ITU-R BT.656)
- ◆ Supports a wide range of video and PC formats including 1080p and WUXGA
- ◆ Separate and embedded syncs, DE generation, BT.656 support
- ◆ 165MHz maximum input clock

Output

- ◆ 24/30/36-bit RGB/YCbCr 4:4:4
- ◆ 16/20/24-bit YCbCr 4:2:2
- ◆ 8/10/12-bit YCbCr 4:2:2 (ITU-R BT.656)
- ◆ Supports a wide range of video and PC formats including 1080p and WUXGA
- ◆ 165MHz maximum output clock

On-Screen Display (OSD)

- ◆ Character-based OSD supports transparency with adjustable foreground/background color
- ◆ 256-character set with 12 x 24 or 128-character set with 24 x 24 characters
- ◆ 128 x 32 character map which can be freely positioned anywhere on the screen

Controls and Clocks

- ◆ I²C- compliant serial interface
- ◆ ABT Serial™ interface – four-wire fast serial interface of up to 10.0 MHz
- ◆ Integrated PLLs
- ◆ 27MHz crystal with oscillator input option

Memory

- ◆ DDR2 SDRAM
 - 256 Mbit (16M x 16) or larger
- ◆ Flexible memory interface supporting 0, 1 or 2 memory devices

Test Pattern Generator

- ◆ Flexible test pattern generator under software control to provide reference test patterns for calibrating displays

Pass Through Mode

- ◆ All formats including 1080p and 3D over HDMI® formats

Audio Delay

- ◆ 10-channel I²S audio support
- ◆ Supports up to 640 ms of audio delay
- ◆ Multiple formats including multi-channel audio (compressed, PCM)

Package

- ◆ 316 BGA (27 mm x 27 mm)

Voltage

- ◆ 1.0V Core, 3.3V I/O, 1.8V Memory

Power

- ◆ < 2.5W

Enhancing the connected HD experience

1060 E. Arques Ave., Sunnyvale, CA 94085

T 408.616.4000

F 408.830.9530

www.siliconimage.com

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